

### Practice Problems: ppm, ppb & Molar Concentration

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1. At 20 °C, a solution of  $\text{KClO}_3$  will dissolve 10.0 g of solute and the solution obtained has a molar concentration of 0.150 mol/L. What is the volume of this solution?
2. What is the molar concentration (mol/L) of a regular coffee (one milk, one sugar) from Tim Horton's, if 5.0 g of sugar ( $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ ) are dissolved in 630 mL (large) coffee?
3. What mass of nickel is in a 2.4 kg solution of propanol if the concentration is 20 ppb?
4. Saline solution, which is used to store contact lenses, contains 0.90 g of NaCl, dissolved to make 100.0 mL of solution. What is the molar concentration (mol/L) of this solution?
5. A meteorologist indicates the level of a given pollutant in the air is 244.5 ppm. What is the mass of pollutants in 234.56 kg of air?
6. The legal limit for human exposure to  $\text{CO(g)}$  in the workplace is 35 ppm. Assuming that the density of air is 1.3 g/L, how many grams of  $\text{CO(g)}$  are in 1.0 L of air at the maximum allowable concentration?
7. What is the concentration of lead (in ppb) in a chemical spill if there is 0.060 mg of lead in 4600 kg of soil?
8. Hydrochloric acid is sold commercially as a 12.0 mol/L solution. How many moles of HCl are in 300.0 mL of solution?
9. The concentration of cholesterol ( $\text{C}_{27}\text{H}_{46}\text{O}$ ) in normal blood is approximately 0.005 mol/L. How many grams of cholesterol are in 750 mL of blood?
10. Calculate the mass of PCBs in a 65.0 kg person, if the concentration is 4 ppm.

**Challenge Question:**

11. Household chemical cleaners often contain ammonia. Industrial strength ammonia is 14.0 mol/L. If 3.0 L of an ammonia solution are needed to clean the house at a concentration of 0.10 mol/L, what would be the volume of the original solution that would be diluted? What volume of water needs to be added to dilute the solution?